# Seminar "Topics in Geometric Analysis"

**ZEIT:**
17.7.2014, 16:15 Uhr - 18:45 Uhr

**ORT:**
Freie Universität Berlin, Fachbereich Mathematik und Informatik
Arnimallee 6, Raum 031

**PROGRAMM:**

16:15 - 17:15 **Claus Gerhardt (Heidelberg)**

**A unified quantum theory: gravity interacting with Yang-Mills and spinor fields**
We quantize the interaction of gravity with Yang-Mills and spinor fields, hence offering a quantum theory incorporating all four fundamental forces of nature. Using canonical quantization we obtain solutions of the Wheeler-DeWitt equation in a vector bundle and the method of second quantization leads to a symplectic vector space (V,Ï‰) and a corresponding CCR representation for the bosonic components and a CAR relation for the fermionic part. The solution space of the Wheeler-DeWitt equation is invariant under gauge transformations and under isometries in the spacelike base space S0 of a given Riemannian metric Ï• ij. We also define a net of local subalgebras which satisfy four of the Haag-Kastler axioms.

17:15 - 17:45 Kaffeepause

17:45 - 18:45 **Apostolos Damialis (FU)**

**Plateau's laws for diffused interfaces**
We present some old and new results on the problem of deriving Plateau's laws at junctions of diffused interfaces via the vector-valued Allen--Cahn equation. We begin with the simplest case of a triple junction on the plane and present in detail a rigorous derivation in the case of triple and quadruple junctions in three-dimensional space.

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As a conclusion, we discuss some aspects of the related problem of deriving Plateau's laws from static balance of forces relations.

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